

**What is claimed is:**

1. A method of minimizing the variations in optical pathlengths in a testing apparatus comprising the steps of
  - 5 providing a source of illuminating radiation for illuminating a sample;
  - arranging said illumination source adjacent to a reflective enclosure that at least partially encloses said sample;
  - illuminating said sample with radiation from said illumination source; and
  - 10 detecting radiation emerging from said sample with a detector.
2. The method of claim 1 wherein said source of illuminating radiation comprises a plurality of radiation sources.
3. The method of claim 2 wherein at least one of said plurality of radiation sources is located within said reflective enclosure.
- 15 4. The method of claim 3 where at least two of said radiation sources are located within said reflective enclosure and said radiation sources are located radially relative to said sample.
5. The method of claim 3 where at least two of said radiation sources are located within said reflective enclosure and said radiation sources are located axially 20 relative to said sample.
6. The method of claim 2 wherein said radiation sources comprise miniature incandescent lamps.
7. The method of claim 1 wherein said detector comprises a plurality of detector units.
- 25 8. The method of claim 1 wherein said reflective enclosure comprises a cylinder open at both axial ends.
9. The method of claim 8 wherein said cylinder encloses said sample.

10. The method of claim 9 wherein said sample is a fluid.
11. The method of claim 10 wherein said fluid flows through said cylinder during time of illumination and detection of radiation.
12. The method of claim 1 wherein said sample contains a bodily fluid.
- 5 13. The method of claim 12 wherein said testing apparatus is adapted for in vivo non-invasive testing of a material carried in said bodily fluid.
14. The method of claim 13 wherein said sample is a finger that is illuminated and from which said radiation is detected.
- 10 15. The method of claim 14 wherein said reflective enclosure only partially encloses said finger in a radial direction, with an opening approximately equal in size to the width of said finger.
16. The method of claim 14 wherein said reflective enclosure totally encloses said finger in a radial direction, and wherein said enclosure comprises said illumination source and said detector within said enclosure.
- 15 17. The method of claim 14 wherein said portion of said finger that is illuminated and from which said radiation is detected is a knuckle.
18. A testing apparatus for simulating sample homogeneity comprising:
  - a source of illuminating radiation for illuminating a sample, said illumination source being arranged adjacent to a reflective enclosure that at least partially encloses said sample; and
  - 20 a detector for detecting radiation emerging from said sample.
19. The apparatus of claim 18 wherein said source of illuminating radiation comprises a plurality of radiation sources.
- 20 25 20. The apparatus of claim 19 wherein at least one of said plurality of radiation sources is located within said reflective enclosure.
21. The apparatus of claim 20 where at least two of said radiation sources are located within said reflective enclosure and said radiation sources are located radially relative to said sample.

22. The apparatus of claim 20 where at least two of said radiation sources are located within said reflective enclosure and said radiation sources are located axially relative to said sample.

23. The apparatus of claim 19 wherein said radiation sources comprise 5 miniature incandescent lamps.

24. The apparatus of claim 18 wherein said detector comprises a plurality of detector units.

25. The apparatus of claim 18 wherein said reflective enclosure comprises a cylinder open at both axial ends.

10 26. The apparatus of claim 25 wherein said cylinder encloses said sample.

27. The apparatus of claim 19 wherein said sample is contained in a fluid.

28. The apparatus of claim 27 wherein said testing apparatus is adapted for in vivo non-invasive testing of a material carried in bodily fluid.

15 29. The apparatus of claim 28 wherein said reflective enclosure is designed to at least partially enclose a finger.

30. The apparatus of claim 29 wherein said reflective enclosure only partially encloses said finger in a radial direction, with an opening approximately equal in size to the width of said finger.

20 31. The apparatus of claim 29 wherein said reflective enclosure totally encloses said finger in a radial direction, and wherein said enclosure comprises said illumination source and said detector within said enclosure.

32. The apparatus of claim 29 wherein said portion of said finger that is illuminated and from which said radiation is detected is a knuckle.